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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/598,038	08/16/2006	Hendrik Johannes Bergveld	NL 040234	9432

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EXAMINER
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TORRES RUIZ, JOHALI ALEJANDRA

ART UNIT	PAPER NUMBER
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2838

MAIL DATE	DELIVERY MODE
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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/598,038	<b>Applicant(s)</b> BERGVELD ET AL.	
	<b>Examiner</b> JOHALI A. TORRES RUIZ	<b>Art Unit</b> 2838	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 8/16/2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 August 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>12/11/2006</u> .  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 101***

1. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

2. Claim 6 is rejected under 35 U.S.C. 101 because it merely discloses mathematical manipulations without clearly stating the use or purpose of said manipulations.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1, 5, 13-15 and 17 are rejected under 35 U.S.C. 102(e) as being anticipated by Teruo (U.S. Patent Number 6,845,332).
5. Claim 1: Teruo teaches measuring the voltage across a battery (104) during a first measurement and converting this measured value into the state-of- charge (Col.6, Lines 19-20); subsequently charging the battery; measuring the voltage across the battery during a second measurement and converting this measured value to a measured state- of-charge value(Col.6, Lines 51-52); determining the accumulated charge during charging by integration of the charge current (Col.6, Lines 7-11);

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subtracting the measured state of charge in the first measurement from the state-of-charge in the second measurement (Col.6, Lines 53-54); and updating the value of the maximum capacity of the battery by relating the charge withdrawn from the battery with the result of the subtraction (Col.6, Lines 55-60), characterized in that at least the second measurement is executed during charging (Col.6, Line 23-26 and 45-51).

6. Claim 5: Teruo teaches the limitations of claim 1 as discussed above. Teruo teaches measurements of battery voltage and battery temperature are taken (Col.4, lines 11-17), the device is capable of obtaining the voltage measurements at substantially the same temperature.

7. Claim 13: Teruo teaches the limitations of claim 1 as discussed above. Teruo teaches a rechargeable battery (104) characterized by means for executing a method as claimed in 1 (Fig.1).

8. Claim 14: Teruo teaches the limitations of claim 1 as discussed above. Teruo teaches the battery is in a vehicle (Fig.1) and the method is done in the vehicle. The vehicle its capable of comprising a charge apparatus (Illustrative reference: Larson U.S. Patent Number 6,690,140) Col.2, Lines 9-12)).

9. Claim 15: Teruo teaches measuring means (110) for measuring the voltage across a rechargeable battery (104) (Col.4, Lines 13-14); storage means (112) for storing a relation between the voltage across the battery and the state-of-charge of the battery (Col.4, Lines 29-32); and current measurement means (108) for measuring the charge current of the battery (104) (Col.4, Lines 11-13); integrating means (116) for integrating the charge current (Col.6, Lines 7-11); calculating means for converting this

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measured value into a state-of-charge value by using a relation between the voltage across the battery and the state-of-charge (Col.6, Lines 51-52), wherein the calculating means are adapted to subtract the results of two consecutive measurements and to update the value of the maximum capacity of the battery by relating the charge supplied to the battery to the result of the subtraction (Col.6, Lines 53-60), characterized in that the apparatus is adapted to execute the second measurement during charging (Col.6, Line 23-26 and 45-51).

10. Claim 17: Teruo teaches the limitations of claim 13 as discussed above. Teruo teaches the apparatus comprises a digital processor (Col.5, Lines 30-33).

***Claim Rejections - 35 USC § 103***

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 2-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Teruo (U.S. Patent Number 6,845,332) as applied to claim 1 above, and further in view of Tamai (U.S. Patent Number 5,747,969).

13. Claim 2: Teruo teaches the limitations of claim 1 as discussed above. Teruo does not explicitly teach that during the second measurement the current has a value at which the battery can be regarded to be in equilibrium.

Tamai teaches measuring a voltage measurement for obtaining SOC takes place in a CV regime (Col.10, Lines 21-27), the battery is being charged using a constant

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regime so it can be assumed the current has a value at which the battery is regarded in equilibrium.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have had the teachings of Tamai in the device of Teruo to have established the state of charge of a rechargeable battery (Col.10, Lines 21-27).

14. Claim 3: Teruo teaches the limitations of claim 1 as discussed above. Teruo does not explicitly teach a Li-ion battery is charged according to the CC-CV-regime and that the second measurement takes place in the CV-regime.

Tamai teaches a Li-ion battery is charged according to the CC-CV regime (Col.1, Lines 14-17) and a voltage measurement for obtaining SOC takes place in the CV regime (Col.10, Lines 21-27).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have had the teachings of Tamai in the device of Teruo to have established the state of charge of a rechargeable battery (Col.10, Lines 21-27).

15. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Teruo (U.S. Patent Number 6,845,332) as applied to claim 1 above, and further in view of Tamai (U.S. Patent Number 5,747,969) and Kutkut et al. (U.S. Patent Number 6,549,014).

16. Claim 4: Teruo teaches the limitations of claim 1 as discussed above. Teruo does not explicitly teach the charging takes place by a pulsed current and that the measurements of voltage and current of the battery are subjected to low pass filtering.

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Tamai teaches a Li-ion battery is charged using pulse current (Col.1, Lines 48-51).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have had the teachings of Tamai in the device of Teruo to have reduced charging time (Col.1, Lines 48-51).

Kutkut teaches measurements of the voltage (Col.4, Lines 41-46) and current (Col.4, Lines 58-61) of a battery are subjected to low pass filtering (Col.5, Lines 1-4).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have had the teachings of Kutkut in the device of Teruo to have filtered out noise from the voltage and current measurements (Col.5, Lines 1-4).

17. Claims 7-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Teruo (U.S. Patent Number 6,845,332) as applied to claim 1 above, and further in view of Feil et al. (U.S. Publication Number 2002/0117997).

18. Claim 7: Teruo teaches the limitations of claim 1 as discussed above. Teruo does not explicitly teach that the value of the state of charge is used to calculate an estimation of the remaining time of use of the battery.

Feil teaches a value of SOC is used to calculate an estimation of the remaining time of use of a battery (Par.57).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have had the teachings of Feil in the device of Teruo to have obtained an accurate estimate of the amount of user time left in the battery (Par.56).

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19. Claim 8: Teruo and Feil teach the limitations of claim 7 as discussed above. Feil teaches in the calculation of the remaining time of use an estimation of the overpotential is used (Par.57).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have had the teachings of Feil in the device of Teruo to have calculated a more accurate value by making use of the overpotential (Par.57).

20. Claim 9: Teruo and Feil teach the limitations of claim 8 as discussed above. Feil teaches the estimation of the overpotential is determined by a model which is regularly updated (Par.59).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have had the teachings of Feil in the device of Teruo to have obtained calculated the overpotential which varies with time (Par.57-61).

21. Claim 10: Teruo and Feil teach the limitations of claim 9 as discussed above. Feil teaches determining the state of charge of a battery (Par.48); charging the battery; measuring the battery voltage at a moment during charging; determining the state-of-charge of the battery at the moment of the measurement by integration of the charge current and adding the result to the initial value of the state-of-charge (Par.54); determining the value of the EMF from the state-of-charge (Par.48); determining the overpotential by subtracting the determined value of the EMF from the measured voltage (Par.58); estimating the overpotential through a model wherein the same values for state-of-charge, current and temperature are used (Par.57-59); and adapting the model by comparison with the determined overpotential (Par.59).



It would have been obvious to one of ordinary skill in the art at the time the invention was made to have had the teachings of Feil in the device of Teruo to have obtained calculated the overpotential which varies with time and SOC (Par.57-61).

22. Claims 11 and 12: Teruo and Feil teach the limitations of claim 10 as discussed above. Feil teaches equations that use the parameters: state-of-charge, the charge current or the temperature, it inherently applies that each time a new parameter measurement is obtained it will be substituted in the equations to obtain overpotential.

23. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Teruo (U.S. Patent Number 6,845,332) as applied to claim 17 above, and further in view of Kutkut et al. (U.S. Patent Number 6,549,014).

24. Claim 16: Teruo teaches the limitations of claim 17 as discussed above. Teruo does not explicitly teach a low pass filter is incorporated into the measuring means.

Kutkut teaches measurements of the voltage (Col.4, Lines 41-46) and current (Col.4, Lines 58-61) of a battery are subjected to low pass filtering (Col.5, Lines 1-4).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have had the teachings of Kutkut in the device of Teruo to have filtered out noise from the voltage and current measurements (Col.5, Lines 1-4).

### ***Conclusion***

25. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOHALI A. TORRES RUIZ whose telephone number is (571)270-1262. The examiner can normally be reached on M- F 9:30am-6pm EST.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Akm Ullah can be reached on (571) 272-2361. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Akm Enayet Ullah/  
Supervisory Patent Examiner, Art  
Unit 2838

/J. A. T./  
Examiner, Art Unit 2838  
JAT